Artificial Intelligence In The Big Data Era And Digital Audit

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Abstract*. The technology industry has entered the 4.0 era, also known as the Artificial Intelligence (AI) era, which has greatly affected various aspects of human life, particularly with the advancement and growth of big data. The integration of AI in our daily lives, including accounting, has made work more efficient, but also brought both positive and negative impacts. The accounting industry is moving towards the digital audit era, which has transformed the perspective of auditors by digitizing their work and making it easier to access and analyze data. This study aims to investigate the impact of AI development on big data and digital audit, the implications of the gap between big data technology and AI and digital audit, as well as the improvement of auditor's work quality and efficiency due to AI and big data technology. The study utilized both quantitative and qualitative research methods, and concludes that the development of Artificial Intelligence has a significant impact on the work of auditors. However, the study acknowledges its limitations, such as the restricted sample size and time constraints which limited the data analysis to multiple linear regression analysis.*

Keywords*: Artificial Intelligence, Big Data, Digital Audit.*

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INTRODUCTION

The rapid development of era is inseparable from the advancement of technology. Starting with technology that developed from sending letters to today, all information can be accessed very easily. The field of information technology encompasses the design, analysis, implementation, support, and management of computer-based information systems, with a particular focus on hardware and software applications (ITTA, 2021). The development of technology is characterized by the emergence of Artificial Intelligence (AI). Artificial Intelligence (AI), which has existed long before the emergence of Industry 4.0, is a machine created by humans, computer programs, and a system that can perform intellectual functions, where it can independently find ways to solve problems and make conclusions and decisions (Shabbir & Anwer, 2018). With the emergence of AI, it can help humans in their work, such as helping in decision-making, displaying data, searching for data, storing data, sending data and many more. The emergence of AI also provides a platform for many people to exchange ideas and data.

According to KBBI, data is information in a form that can be processed by computers, such as digital representations, of text, numbers, graphics or sound. As we know today, the amount of data and information in the world is already very large, even data can be sent quickly from one place to another, so now humans live and reside in the era of big data technology. Big data technology is now a crucial component required in performing analysis, however, it should be noted that there is a doubt between the features of big data which are Volume, Velocity, Variety, and Veracity. The large amount of data, varied and quickly accessible data brings doubt in data usage. The big data technology created has raised doubts about the accuracy of data, data consistency, and data aggregation for its users, one of which is the auditor.

It cannot be denied that at present, auditors who are entering the digital audit industry need big data technology that can help auditors in their work. The digital audit industry is the association between technology and the work of accountants as auditors. Digital audits also offer ease for auditors' work, especially in decision-making and problem-solving in an attractive way. The current development of big data technology and AI is crucial and interesting for auditors for the sustainability and growth of the audit industry, especially in decision-making and forming opinions on a problem being faced. Without the use of big data and AI, auditors will take much more time to resolve a

problem. This research was conducted to find answers to the gap that occurred in big data and the utilization and influence of AI technology on auditor work. Besides answering the gap, this research is important to be carried out because this research can increase awareness of the importance of big data technology and the role of AI.

Based on the background described above, the following research questions can be formulated: 1) Does the development of Artificial Intelligence (AI) have a significant impact on big data and digital audit? 2) Does the gap in big data technology have an impact on AI? 3) Can AI help auditors improve the quality and efficiency of their work? The results of this study are expected to provide insights to organizations, especially Kantor Akuntan Public (KAP), on the use of AI and big data technology in audit activities to enhance their services to clients.

LITERATUR REVIEW

Artificial Intelligence (AI)

"Artificial Intelligence (AI)" is a captivating term both for amateurs and the scientific community in AI. The concept of creating human-made machines or creatures that can think, learn, and make decisions on their own is truly amazing and has been a part of popular culture for several decades. Since the late 19th century, science fiction writers such as Isaac Asimov and Arthur C. Clarke have sparked human imagination with their depictions of Artificial Intelligence (AI). Today, the entertainment industry continues to showcase AI in various forms, often based on the real science behind this rapidly evolving technology.

The impact of AI technology is evident in various industries, such as manufacturing, publishing, utilities, education, gaming, and other service sectors. The use of AI in accounting and auditing is also becoming more common, and the latest advancements in AI technology have the potential to revolutionize the way professions and disciplines are practiced worldwide. As such, it is essential to comprehend the latest AI trends and keep up with interdisciplinary developments to remain competitive in this modern era. (Hasan, 2022)

The Development of Big Data

The term Big Data describes vast and intricate datasets that conventional database management systems or other data processing applications cannot handle. Gartner IT Glossary defines Big Data as: "high-volume, high-velocity, and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision making, and process automation" (IT, 2022). According to the definition given by the Gartner IT Glossary, Big Data can be characterized by three main aspects, which are often referred to as the 3Vs: volume, velocity, and variety. Volume relates to the large amount of data that requires management. Velocity refers to the speed at which data needs to be processed, which must be balanced with the rapid growth of data volume. Variety refers to the diverse nature of data sources, including both structured databases and unstructured data. (Maryanto, 2017)

Triggers of Big Data Development

According to Hilbert and Lopez, the development of big data is triggered by three main factors (Fajriatinovy, 2017). Firstly, the significant growth of data storage capacity due to the shift from analog to digital data storage. Secondly, the rapid increase in computing power and processing capabilities due to technological advancements in hardware. And finally, the abundance of available data, with companies in various sectors possessing massive amounts of data. In the United States, companies are reported to have around 100 terabytes of data, and some even possess more than 1 petabyte.

The Gap Created by the Emergence of Big Data Technology

The emergence of big data technology in the era of the internet of things has provided many benefits to human work. However, among all the functions and characteristics of big data, the fifth characteristic raises doubts and gaps in the use of big data. According to Zhang, Yang, and Appelbaum (2015), the fifth characteristic is data confidentiality, which means that certain data or associations among data points are sensitive and cannot be released to others. The confidentiality of big data has become increasingly urgent and important for maintaining brand image and securing competitive

advantage. Therefore, auditing of confidential big data is necessary, and software automation can protect data from routine human observation and handling.

The use case of big data in financial services

The advancement of thinking in the banking and financial services industry involves the utilization of large amounts of data. This type of business also utilizes data to identify new market opportunities and reduce fraud. As a result, several financial service companies have gradually begun utilizing this approach to gain a competitive advantage. The financial services industry faces numerous challenges related to security, compliance, and fraud detection. Big data has emerged as a powerful tool to address these issues. By leveraging big data analytics, financial institutions can identify patterns of fraudulent activities and gather data to streamline regulatory reporting. (Oracle, 2020)

Additionally, big data insights can help companies gain a better understanding of market trends and customer needs, which can drive innovation and improve decision-making regarding new products and services. Furthermore, anti-money laundering laws have put more pressure on financial service companies to demonstrate appropriate diligence and report suspicious activity. Big data analytics can assist in identifying potential fraud patterns in this complex area. Lastly, financial service companies must comply with various regulations regarding risk, behavior, and transparency. Big data analytics can aid in complying with requirements such as the Dodd-Frank Act, Basel III, and other regulatory reporting mandates.

Digital Audit

Digital audit involves assessing the active media channels to evaluate their efficacy in current campaigns. Conducting an audit beforehand can establish a foundation based on past performance, and help to identify the channels available for future plans. In the field of economics, auditing is one area that has benefitted from technology in terms of enhancing effectiveness and efficiency due to the constraint of limited time. As a result, auditors heavily rely on technology to reduce the amount of time required to complete their work. (W Ayu, 2018)

Artificial Intelligence (AI) in Audit

The emergence of big data has led to the development of Artificial Intelligence (AI) that can process and analyze large and complex data sets. AI algorithms can enhance or replace human work in decision-making tasks, such as loan approvals, product recommendations, contract reviews, and predicting weather. Artificial Intelligence possesses intelligence in thinking, has a broad knowledge base in a limited domain, uses structured reasoning to make decisions or solve problems (Riantono, 2021). In auditing, AI can minimize the time-consuming process of reviewing client documents and improve the efficiency and accuracy of the confirmation and inventory calculation process. However, AI cannot replace the auditor's judgment and consideration, as they are still needed to assess data completeness, evaluate the strength of internal controls, and determine asset valuations' reasonableness. Therefore, auditors should embrace technology as a tool to enhance their abilities and effectiveness in performing their tasks. Auditors are still needed to determine data completeness, assess the strength of internal controls, and evaluate the reasonableness of asset valuations, as these tasks require human intuition and interaction. The intuition of an auditor is necessary to understand their client's character, whether they have integrity or not. (W Ayu, 2018).

Research Model
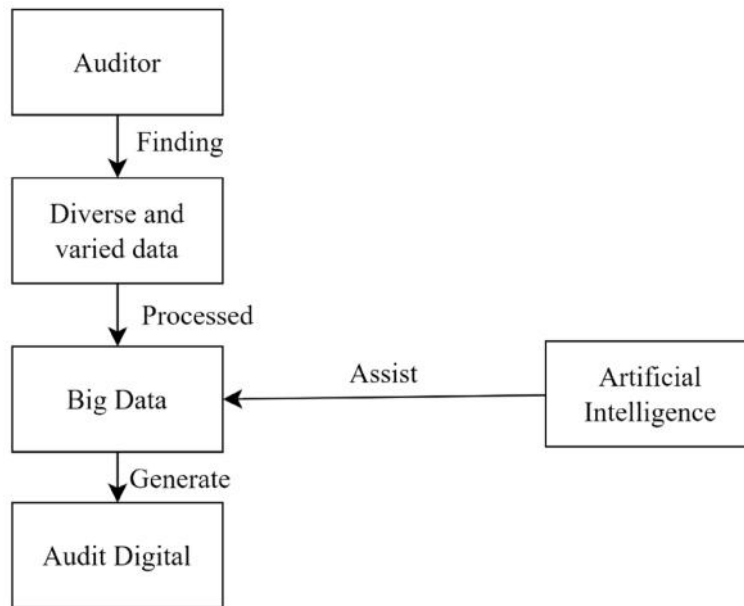
Source: Author's Processed Data
**Figure 1. Research Model**

RESEARCH METHODS

Based on the classification of research into two types, the researcher decides to use the quantitative and qualitative research methods. Quantitative research is a systematic study that links variables systematically, while qualitative research is conducted through observation and case studies of a theory. The measurement of audit quality will be based on indicators of Audit Quality in Public Accountants. The independent variable used in this research is the factor of Artificial Intelligence. The data will be processed using the Likert scale (ordinal).

The primary data for this research is from a survey in the form of a questionnaire that has been distributed to several auditors, both in the Big Four public accounting firms and non-Big Four. Secondary data in this research will be obtained through a data collection technique through a literature review. The data will be processed using the SPSS (Statistical Package for Social or Science) version 26. The significance level used in the research is 5%. The type of analysis performed is Data Quality Test and Simple Linear Regression Test. The following is an explanation of the results of the processed data that has been collected.

RESULTS AND DISCUSSIONS

The research data was collected using Google Form and distributed online. The questionnaire was distributed from May 9, 2022, to May 25, 2022, and was sent to active auditors working in Public Accounting Firms. The questionnaire was distributed by sending emails to active Public Accounting Firms in 2022. A total of 112 emails were sent, and 33 respondents completed the survey. Among the 33 respondents, 17 (51.51%) work in Big Four Public Accounting Firms, while 16 (48.49%) work in non-Big Four Public Accounting Firms. The following is a diagram of the total respondents:
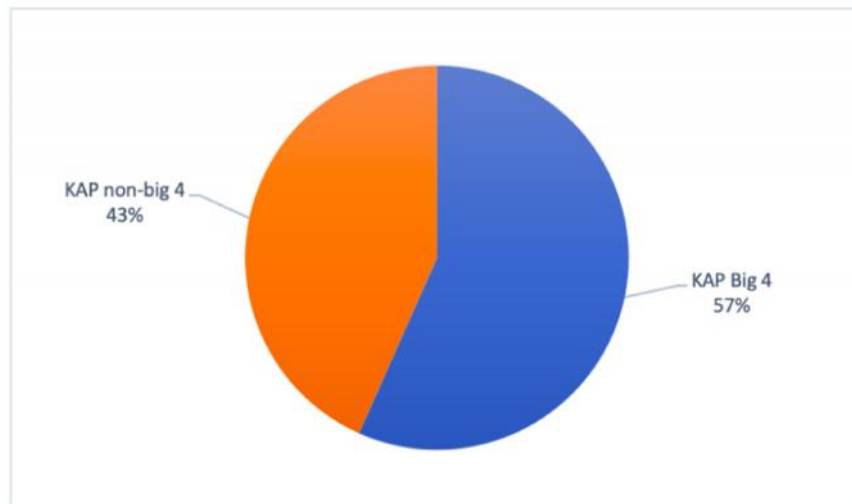
Source: Author's Processed Data
Figure 2. Respondent Age

All data for the Big Data, Digital Audit, and Artificial Intelligence variables are valid based on all r-values of the data exceeding the r-table value of 0.344 based on the Pearson Correlation for a sample size of 33 respondents. Therefore, all questions will be included in the reliability testing calculation.

Based on the testing conducted, it is known that the results obtained from the Big Data, Digital Audit, and Artificial Intelligence variables are reliable, as seen from all Cronbach's Alpha values being greater than 0.60. It can be concluded that the results obtained from the testing are reliable for use in research, where the research will produce the same results if used again to measure the same object. After conducting the validity and reliability tests, the next step is to perform a simple linear regression test. The following is a chart of the results:

Table 1. Simple Linear Regression Result

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.586[a]	0.343	0.299	3.65647	
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	209.639	2	104.819	7.840	.002[b]
Residual	401.093	30	13.370		
Total	610.732	32			
Model	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t Stat	P-Value
(Constant)	5.165	4.356		1.186	0.245
Audit Digital (X1)	0.431	0.181	0.355	2.385	0.024
Big Data (X2)	0.478	0.168	0.424	2.847	0.008

Dependent Variable: Artificial Intelligence (Y)
Predictors: (Constant), Audit Digital (X1), Big Data (X2)
Source: Author's Processed Data

After conducting the validity and reliability tests, the next step is to perform a simple linear regression test. The following is a chart of the results:

$$Y = 5.165 + 0.431 \text{ Audit Digital} + 0.478 \text{ Big Data}$$

The constant value is 5.165. If the values of Digital Audit and Big Data are both 0, it can be concluded that the value of Artificial Intelligence (AI) is 5.165. The regression coefficient value of Digital Audit is 0.431, indicating a positive direction, meaning that for every increase of 1 in Digital Audit value, the quality of audit will increase by 0.431. The regression coefficient value of Big Data is 0.478, also indicating a positive direction, meaning that for every increase of 1 in Big Data value, the value of Artificial Intelligence (AI) will increase by 0.478. The most dominant factor affecting Artificial Intelligence (AI) is Digital Audit, as it has a significant influence with a P-value of 0.024.

The Adjusted R Square value is 0.299, indicating that Artificial Intelligence (AI) is developing in the era of big data and digital audit, with a growth rate of 29.9%. From this value, it can be inferred that there is a positive correlation between the era of big data and digital audit and the development of AI in human work, particularly in the work of auditors. The Significance F value is 0.002, indicating that there is a simultaneous development of AI, big data technology, and digital audit. This answers the research question, as the value of significance F is less than the coefficient (0.05). Overall, the findings suggest that there is a positive relationship between the development of AI and the era of big data and digital audit, and that these factors can be used to predict the growth of AI in the field of auditing.

The development of Artificial Intelligence (AI) in the era of big data and digital audit has significant impact on the work of auditors. The development of digital audit in line with AI and the continuous advancement of big data technology have a positive and significant effect on the work of auditors, making it important to consider these three elements together in the work of auditors. This is particularly relevant as digital processes have become commonplace in auditing, utilizing the advancements of AI that have a positive impact on the work of auditors. Undeniably, the rapid advancement of technology has driven the digitalization of auditing and the development of big data technology, and subsequently influenced the development of AI in all fields of work, including auditing. The momentum generated by the work of auditors shapes the rapid development of AI. In summary, based on the research findings, the development of AI in the era of big data and digital audit has progressed in tandem, creating a cohesive environment for the development of technology. This is also evidenced by the significant F-test value, which is greater than the alpha coefficient, indicating a simultaneous effect on the development of technology.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the research conducted, several conclusions can be drawn as follows:

1. The development of Artificial Intelligence has a significant impact on the work of auditors, and it also answers the problem that has arisen, which is whether "auditor's jobs will be replaced by robots". This is not a concern as the existence of AI will help auditors to lighten their workload.

2. The emergence of big data technology has raised doubts about its effectiveness, but it also creates a good opportunity for the growth and development of AI. It enables AI to improve and overcome any uncertainties related to big data technology.

3. The existence of digital audit technology provides a positive impact on the lives and work of auditors. The development of digital audit technology, in line with the growth of big data and AI technology, enhances the efficiency and quality of auditor's work.

Limitations

Despite the efforts put into this study, there are still limitations in both the process and results. It is hoped that future research studies can address these limitations and provide a more comprehensive understanding of the topic. The limitations of this study include:

1. The study resulted in a low Adjusted R Square value of 29.9%, indicating that only a small portion of the variance in the dependent variable can be explained by the independent variables tested. This suggests that there may be other factors that were not examined in the study that could have a significant impact on the results.

2. Due to time constraints, the data analysis conducted was limited to multiple linear regression analysis, and the sample size was limited to 33 respondents. Future research studies can expand on these limitations by using additional statistical tests and increasing the sample size.

Recommendation

Based on the previous discussions and conclusions, a set of recommendations has been formulated for the research that was conducted. These suggestions may prove valuable to a variety of stakeholders. The research has yielded several recommendations, which are outlined below:

1. For Auditors, as the work of auditors is already within the realm of digital audits, which is growing and developing based on the emergence of AI itself, auditors can further improve their use of digital audit technology to increase their work efficiency.

2. For Public Accounting Firm, it is recommended to consider the use of big data and digital audits in data processing. This is also influenced by the growth and development of digital audits, which continue to improve, and have an impact on the development of AI to become more efficient and form work patterns that can help auditors.

3. For next researcher, it is hoped that they can further develop all aspects covered in this paper to make it more comprehensive and add any missing aspects. Next researchers can also consider other tests and expand the scope of respondents to make the research more comprehensive.

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